THE MAC Flyer

AUGUST 1984

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THE MAC Flyer

For Greater Safety in MAC Air Operations

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DEJA VU: A Classmate Remembered

by 1st Lt. Stephen J. Robison
1402 MAS
Andrews AFB, Maryland

"Hey, what happened to all the nametags that used to be over the bar in here?" Maj. Sam Morgan asked the bored looking bartender in the officer's club.

"How should I know? Only been here a month," she replied, not looking up from the fingernails she was painting. "They're always changing these places around anyway," she added.

On a Tuesday night the o-club was practically empty. Only a few wings and nametags were stuck to the carpet-covered wall behind the bar; certainly not a dozen years' accumulation.

I'm starting to get old if I let these things bother me, Sam thought. I should have known they'd have remodeled. Nothing here's likely to be the same.

Coming back to his old pilot training base after a dozen years had awakened many old memories for the junior major and he was hoping he'd recognize some familiar names among the nametags which used to embellish the bar. There was one name in particular he had in mind on his unexpected trip back to Willy. The bar was different now, but the room was the same one in which he'd celebrated on assignment night, 1971.

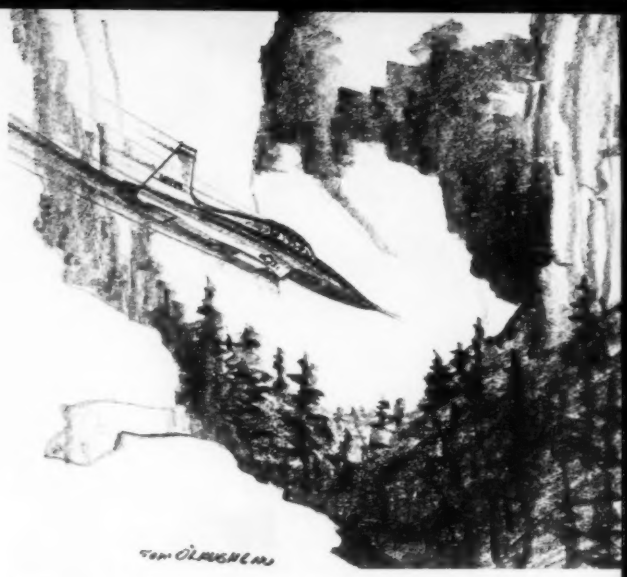
"That's somebody we'll be reading about one of these days." Second Lieutenant Sam Morgan's observation over a beer at the Willy o-club seemed unnecessarily pessimistic, and maybe even a little spiteful. Especially since Lt. Gary (Zoom) Baker, the object of his comment, seemed firmly established as "top stick" in Buster Flight, and Sam, although a dogged student, was on special monitoring status for a series of busted formation rides.

"We'll be reading about Zoom one of these days, all right" commented Sam's roommate and friend, Lt. Dale Foster, refilling both empty beer glasses. "Maybe something like, 'F-4 Hero Wins Vietnam War Singlehanded, Awarded State of California by Grateful Nation'?"

"That's not what I meant. More like, 'Student Pilot Digs Hole in Desert,'" Sam said in a low voice.

"Aw, come on Sam," Dale said, looking down the crowded bar. "That's not like you; sounds too much like sour grapes."

Second Place Winner, 1984 MAC Flying Safety Writing Contest



At 27, Sam Morgan was the oldest second lieutenant in Buster Flight, Class 71-04. His maturity was reflected in a businesslike approach to his studies and a frankness about his own flying limitations—traits which helped him earn high marks in academics and the confidence of his classmates.

Sam grinned at his roommate's ribbing. "Come on, Dale, you know I'm not looking for a fighter outa here like Zoom and the whiz kids. The 38s are great, but trash-hauling in 141s is all the adventure I'm looking for. I'm just afraid Zoom's going to get in over his head one of these days."

Down the bar, "Zoom" Baker was rolling dice with his IP and two other student pilots to determine who was buying the next round at the ritual Friday beer call.

"You don't have to worry about Gary," Dale told Sam. "Zoom's got good hands."

"It's not his hands that'll get him in trouble," Sam replied. "It's his head."

Gary Baker seemed made for the F-4 cockpit which awaited him out of UPT. In '71, the Phantom was still the Air Force's foremost fast-mover, and as Gary never tired of saying, that cockpit was "the only place to be." With a new 240-Z and sideburns which liberally interpreted 35-10, Gary cultivated a 'fighter jock' image; an image he did his best to promote by boasting on Friday nights of his flying and romantic prowess.

How many of the 500 hours of Citabria time he claimed were logged only in his imagination was anyone's guess, but his skill with the T-37 was testimony to either considerable experience, or a natural predisposition to "pulling Gs". Whether with envy, jealousy or admiration, people *reacted* to being around Zoom; in Buster Flight, that was one guy you just didn't feel neutral about.

Gary's weekend flying experiences out at Sunbird Field were common knowledge among his classmates. One incident, which would have gotten him thrown out of pilot training had he ever publicly taken credit for it, was witnessed by over half the class one August Saturday. Taking turns waterskiing behind a rented ski boat at Canyon Lake, few members of Buster Flight had any trouble guessing the identity of the Cessna pilot who buzzed the fast moving ski boat. The pilot dropped streamers of toilet paper on each of three passes before zooming the aircraft and performing a low altitude snap roll on his last pass. The identification numbers on the 150 Aerobat had been obscured with butcher paper and masking tape, over which was printed in big block letters, "ZOOM." The adoption of Gary's nickname was assured by the incident.

Although the buzzing was reported in area papers, the identity of the phantom aerobat was kept secret by tacit agreement in the flight. Later, when he thought of it, Sam wondered if in the end their silence hadn't amounted to complicity.

So, though his weekend adventures over the rough Arizona landscape were well known in Buster Flight, Zoom's veiled references to his T-37 and T-38 solo exploits left a little more to the imagination. Without exactly saying so, he conveyed the message that spins, a dual-only maneuver, were one of the best things about solo Tweet rides. He would also describe how well the plane would perform various aerobatic maneuvers which weren't in the Air Force syllabus, such as snap rolls and hammerhead stalls. Gary was also fond of saying, with a wink, "If your mode C were to, say, stop working, you could have a pretty good time exploring some landscape out in the rocky Williams MOA."

His overriding desire to display what would one day be known as "the right stuff" probably made Zoom's untimely end inevitable. Looking back, as he had so many times in the past decade, Sam reflected it was remarkable it took as long as it did for Gary to turn up missing late one Friday.

Sam was on recorder duty in the runway supervisory unit, and was among the first to realize something was wrong when Zoom, on one of his last T-38 solo rides, was noted 5, 10, then 15 minutes late. Neither the tower, approach control, nor Albuquerque Center had heard from him, so the base initiated a search. At 30 minutes overdue, the last of the other solo students landed. Official sunset passed. Dual crews which diverted to search for him recovered. The crew bus came out to the mobile unit as the field closed. Looking at his watch, the mobile controller observed, "Well, he's on the ground now, one way or another. By now he's out of gas."

By the time Sam got to the club, the news that Zoom was missing had preceded him. His roommate met him at the door of the club. "Any news?" he asked.

"Last I heard they'd called off the search for the night," Sam said.

"Oh, I wouldn't worry. You know Zoom. He's probably cooking weenies over a campfire in Globe right now," Dale said.

"I wonder," Sam replied.

"Then again," said Dale, the first hints of doubt appearing on his worried face, "maybe you were right Sam. Maybe tomorrow is the day we'll be reading about him."

"You want another drink?" the bartender asked, lightly blowing on her now glossy fingernails. The major looked at his nearly empty glass and swirled the melting ice cube.

"No, I don't think so. Didn't really come here to drink tonight," he said. "There was something else I wanted to see...an old nametag. You know I went to pilot training here a dozen years ago and we used to put our nametags on the wall after we'd finished our last checkride."

"Really?" the bartender asked, turning to scan the velcro nametapes and unit patches above the rows of bottles. "So you were looking for yours, huh?"

"No. One of my classmates." The major paused, not wanting to sound too dramatic, "Our first casualty, you might say."

"Died in the war, huh?"

Sam smiled, remembering what a show Gary had made about trying to get to Vietnam with his Phantom before all the American units were withdrawn.

"Yeah. Big hero, you know. He was that kinda guy."

Sam remembered the memorial service in the base chapel, a week before graduation. They'd found the T-38's wreckage in a rugged gorge the day after the crash. Zoom was still in the seat. It didn't appear that he'd tried to eject. The investigation board concluded, based in part on the testimony of his classmates, that he must have deliberately violated the airspace limits of his area and gone 'sightseeing' at low altitude in the MOA.

"I suppose I'd forgotten what he was like. Too hot to handle, too slick to catch." Sam finished his drink. "But I guess there are still guys like him coming through here."

Sam looked at his watch. It was time to hit the sack. Report time was 0600 for the first day of the safety investigation board. This investigation of a solo T-38 fatality would be his first experience as a board member since graduating from the Aircraft Mishap Investigation Course. The case was complex, of course, yet from the preliminary reports, there was something strangely familiar about it, too.

ABOUT THE AUTHOR

Lieutenant Robison is a 1981 graduate of Seattle University. A former flight medic with the 40th Aeromedical Evacuation Squadron (AFRES), McChord AFB, he received his commission from OTS in 1981, and entered pilot training at Williams AFB. Lieutenant Robison graduated from UPT in 1983, and is now a C-21A first pilot with the 1402 MAS, Andrews AFB.

OXYGEN DISCIPLINE

How do you spell P-R-I-C-E?

by 1st Lt. Barry N. Kinter,
50 TAS
Little Rock AFB, Arkansas

Top right, a crewmember checks one connection of his quick donning mask.

Below center, the most critical step is sometimes the simplest.

Bottom right, check pressure in the "emergency" position.

A couple of months back, I was navigating the return leg of a C-130 overwater training mission. We had experienced some trouble with the torque gauge on the number two engine, so we decided to terminate early. As I looked up at my compasses, I saw smoke billowing over the crew bunk. I excitedly pulled the quick don oxygen mask out of its restraining strap, put it on, and announced to the crew "smoke in the cockpit, oxygen 100 percent." The rest of the crew quickly went on oxygen. The smoke continued to pour over the bunk. I assumed the number two engine was giving us a problem; but as the pilots scanned the engine instruments, the loadmaster turned off the oven and rescued his extra-crispy smoking chicken. When the smoke cleared, I took off my oxygen mask. As I reached up to replace the restraining strap, I found that the mask was not connected to the aircraft oxygen system. The mask I had preflighted was sitting on the other side of the crew bunk, where I had been for the first half of the flight. It was ready for use.

Fortunately, small doses of burned chicken fumes are non-toxic. I was lucky—this time.

The oxygen equipment provided on our aircraft can protect us from the inhalation of smoke and fumes. It also gives us the ability to function in an oxygen deficient environment. An actual mishap illustrates this.

A C-130 was flying over the Pacific at FL 220 when the doppler radome failed. A rapid decompression occurred as the aircraft cabin altitude went from 4,000 feet to 22,000 feet instantaneously. The primary crew donned their oxygen masks and checked in with the aircraft commander as he began an immediate descent to 10,000 feet.

There were two crew chiefs on board the aircraft, but neither had completed physiological training. The primary crew chief attempted to don one of the aircraft smoke masks. However, his lack of familiarity with the oxygen equipment caused him to deplete the oxygen supply in the portable oxygen bottle. The loadmaster then assisted him in connecting his mask hose to an oxygen regulator. Prior to receiving oxygen, this crew chief experienced some dizziness and became uncoordinated.

At the time of the decompression, the secondary crew chief was asleep in the crew bunk. He awoke, mistook the mist on the flight deck for smoke, and went to the cargo compartment to look for a possible fire. He realized that a decompression had taken place and unsuccessfully tried to connect a smoke mask to a portable oxygen bottle. He returned to the flight deck where the navigator and the engineer assisted him in putting on his mask and connecting to an oxygen regulator. The secondary crew chief remained conscious, but did not recall being assisted with his oxygen equipment.

Both crew chiefs suffered briefly from hypoxic hypoxia. Their symptoms disappeared after they were supplied oxygen. They were fortunate that their time of useful consciousness (TUC) was long enough to allow them to find a suitable source of oxygen.

TUC is the period of time following the loss of sufficient oxygen supply at altitude until an individual is unable to perform a deliberate act. Factors such as cabin volume, size of the opening that caused the decompression and pressure differential effect this TUC. The following table approximates the TUC at different altitudes.

Altitude	Time of Useful Consciousness
FL 180	20 to 30 minutes
FL 220	10 minutes
FL 250	3 to 5 minutes
FL 280	2.5 to 3 minutes
FL 300	1 to 2 minutes
FL 350	0.5 to 1 minute
FL 400	15 to 20 seconds
FL 430 and above	9 to 12 seconds

As you can see, the TUC at FL 220 is approximately 10 minutes. Had this aircraft been at FL 400 (unlikely for a C-130, but possible on other MAC aircraft), the TUC for this crew would have been reduced to about 18 seconds. Much more severe physiological consequences could have resulted.

A lack of oxygen for a prolonged period of time results in several subjective and objective symptoms of hypoxic hypoxia. Some of these subjective symptoms (those felt by the person) are: Headache, fatigue, light-headedness, tingling or warm sensations, impairment of vision, apprehension, and nausea.

Some of the objective symptoms (those identified by others) of hypoxia are: Increased breathing rate, cyanosis, loss of muscle coordination, impairment of judgment, unconsciousness.

As the incidents show, supplemental oxygen may be necessary for you to function in the aircraft environment. You may never have a need for your oxygen equipment in-flight, but if you do, proper oxygen discipline can save your life.

Oxygen discipline consists of proper preflight of your equipment and a thorough knowledge of all available oxygen systems on your aircraft.

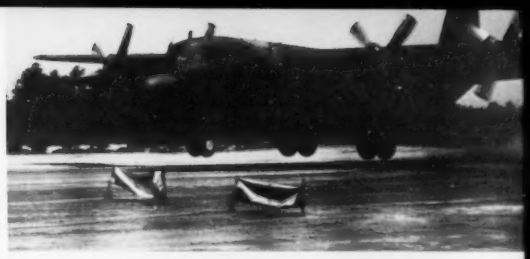
When you preflight your oxygen equipment thoroughly, you insure its reliability. Even beyond your own personal oxygen equipment, you need to have a working knowledge of the other oxygen systems on board your aircraft. Remember the crew chiefs who had difficulty with the portable oxygen bottles? You don't know where you'll be when disaster strikes. The next time you get a chance, walk through your aircraft and investigate the various oxygen systems. Try them on. Try them out. Be confident that in an emergency, you'll be able to don any one of your aircraft oxygen systems.

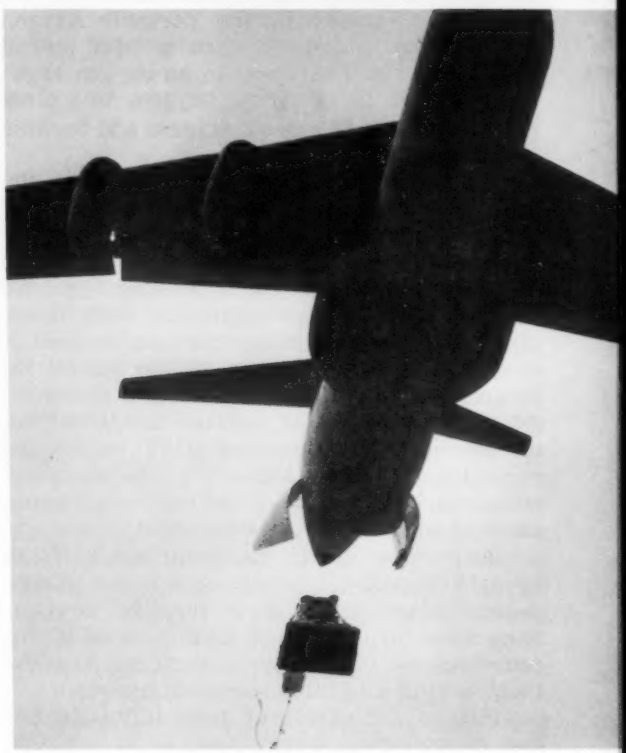
On MAC aircraft, we have a responsibility to insure that all who fly with us understand the basic operation of our oxygen systems. A few minutes of our time prior to flight can save critical moments if an emergency occurs.

Whether you're faced with a rapid decompression or toxic fumes, that oxygen is there as a life support system. Learn your system and practice oxygen discipline. The next time you have to go on oxygen, it may not be to escape the smell of burned chicken. ✭

VOLANT RODEO

MAC's 1984 Airdrop Competition





Load Clear! The 445 MAW shows winning form with a heavy equipment airdrop.

by Capt. Bryon L. Howard
Associate Editor

Pope AFB, N.C.—Volant Rodeo '84, the sixth rendition of MAC's annual tactical airdrop competition, started off with the promise that, by the end of the week-long event, at least a few teams' thirst for trophies would be quenched. Since 1979, Volant Rodeo has been staged among the North Carolina pines to see "who's best at what."

One of the best qualities about the Volant Rodeo competition is the international flavor which Pope takes on during this one week in the summer. This year, eight foreign teams from Australia, Brazil, Canada, Germany, Italy, New Zealand, Saudi Arabia, and the United Kingdom participated. And speaking of flavor, most of the participants especially looked forward to the Italians' now-traditional Wednesday night spaghetti dinner. Although not entirely evident at the beginning of this unorthodox sort of rodeo, but more than obvious at the week's end, the eight allied teams had come to compete and win! But that's getting ahead of the story.

So, who won what?

Starting off with the joint inspection competition, you have to admire the 1 MAPS of the 463 TAW, Dyess AFB, Texas. These dedicated professionals scored no less than a perfect score—200 points—in finding a number of things wrong with their "officially" sabotaged heavy equipment and CDS loads. Not content with winning just that event, though, the 463 TAW also walked away with the fastest time in the ERO competition for C-130s. Logging the fastest time in the C-141 ERO competition was the 438 MAW, McGuire AFB, New Jersey.

Among the combat control teams, the Italian team from Pisa proved they had the "right" stuff by winning that competition. Second in the overall CCT scoring, but winning outright the six-mile run with 40-pound pack were the CCT members of one of MAC's newest units, the 1st SOW, Hurlburt Field, Florida.

Taking first place in the security police competition was the team from the United Kingdom, with the SPs from the 1605 ABG, Lajes AB, the Azores, and the 63 MAW, Norton AFB, California, in second and third, respectively.

Of special interest to C-130-types was the short-field landing competition. The team from Australia, actually from 36 Sqdn., Richmond, won this year's assault landing event. Ever on the lookout for a new technique to pass on, the author asked Flight Lieutenant (pronounced *Lef*-tenant) Al Dyer just what he did to land so precisely.

"It's just something that you learn through

practice," he simply stated. "We do have a lot of dirt strips in Australia, though, and we go into those a lot." Dyer went on to say he didn't really do anything different from the recommended procedures in the C-130 flight manual. Surprisingly, most aircraft commanders who did well in this event really didn't deviate from the Dash-One recommended procedures. Just four points behind Australia was last year's winner in this event, the 146 TAW, Van Nuys, California, and another four points down was the 433 TAW, Kelly AFB, Texas.

New Zealand's team from 40 Sqdn., Auckland, won both the Best C-130 Aircrew and Best Allied Team events. Their chief, Wing Commander T.K. Butler, himself a former exchange pilot to the 314 TAW, had this explanation for his team's success. "Just plain hard work," he said smiling, "but our tactical training officer is an American." New Zealand was also third in the "Best Overall Wing" competition.

Of all the events that took place on the ground, it appeared the maintenance judging was especially *persnickety*. (*Editor's Note:* P-e-r-s-n-i-c-k-e-t-y is really a word, and the best we could find to describe the maintenance judges. But in this case, we're *glad* to see persnickety people in this profession.) For instance, the maintenance team from the Mississippi Air National Guard's 172 TAG thought the maintenance judges were all "screwed-up." During the preflight inspection of their ultra-pristeen C-130H, the maintenance inspectors found two tiny screws on the cargo compartment thermostat-attaching L-bracket were installed from the bottom up, not from the top down as the manual showed.

Clockwise from top left: An MC-130 from the 1 SOW shows a different look for Herks at Volant Rodeo. Squadron Leader Andy Clarke, RAF, looks for a checkpoint on a low-level route. Combat controller SSgt. Dave Libby, 1300 MASS, struggles across the finish line in the 6-mile run with 40-pound pack. He finished in 9th place. MSgt. Jimmy Dial, 910 WSSF, goes through the back crawl during the security police endurance competition. Green Ramp at Pope AFB was, shall we say, crowded? TSgt. Robert Strollo, 1 SOW loadmaster, makes a final adjustment prior to takeoff for a heavy equipment drop.

Photos by SSgt. Phil Schmitten , TSgt. William Talley , TSgt. Ernest Sealing .

"Screwed-up is right!" remarked MSgt. Francis E. Holland, the 172d maintenance team chief. "That fitting hasn't been touched since that Herk was delivered to us direct from the factory. It's still got the original paint on it!" The net result of this "screw up" was a minus 1½ points. Of course, 598½ points out of a possible 600 isn't bad at all, and the men from Mississippi were grinning from ear to ear. But when the final preflight scores were in, the Italians had topped the 172d by—you guessed it—1½ points. In the end, just *six* points separated the two top maintenance teams with the West German team finishing first followed by the Mississippi ANG.

Of course when you win *anything* at Volant Rodeo there's cause to celebrate. For TSgt. Charles Brown, a loadmaster on the Best C-141 Aircrew, and his team chief, Lt. Col. Claude Jackson, Jr., this year's trophy marked the end of a long drought, both having made about half of the Volant Rodeos to date, but always going home empty-handed. At the barbecue on Friday afternoon after the winners had been announced, Sergeant Brown showed up handing out cigars, and Colonel Jackson sported a T-shirt proclaiming its wearer the "Team Chief, Best C-141 Aircrew."

Maybe one of the things that helped the 445 MAW crew was a crude but effective sighting system, which may have improved their airdrop scores just enough to win. Through a series of strings placed strategically on the inside of the cockpit windows, the crew found they could accurately align their aircraft over the DZ in relation to the navigator's computed air release point (CARP).

"The nav could look directly at the DZ—not out to the side—so he could concentrate on DZ alignment," explained the AC, Capt. Hans Martel. "He didn't have to keep switching from looking out the side windows to looking out the front windows and back." Hopefully, *TMF* will have more on this innovative "system" in a future issue.

Brig. Gen. Robert B. Patterson, Volant Rodeo competition commander for the second time, was especially pleased by the intensity of the week's events. "Each year we've tried to make the competition a little tougher, and each year, the teams come back that much better," General Patterson said. "Everybody here is our ally. It's comforting to know they can perform these missions, and in many cases, do them better than we can. In the end," he continued, "it can only stimulate more international competition and cooperation."

Finally, the team to beat proved to be the Italian team representing 50 Group, Pisa. This makes the second time in the last three years the Italians have walked off with the William G. Moore Trophy for Best Overall Wing.

This year's events were probably the most safely conducted to date. Dozens of missions were flown during the multi-national exercise without a mishap, with only one Army jumper hurt during the week. The international team of umpires did an impressive, though sometimes thankless job of scoring, and showed an uncommon degree of impartiality.

Although no one can say how much he or she learned during this year's Rodeo, learning did indeed take place. When the participants weren't actively doing something, which wasn't very often, you could usually find them gathered around the scoreboard, or talking to a friend not seen for many years. But about half the time, you could usually find an American and an ally "talking shop."

"We'll pass on what we've learned here to next year's competitors," said Capt. Glenn Baker from the 1 SOW. "And we'll be back—to win!"

If you've never been to Volant Rodeo, work hard and try to go. Once you get there, the days will be long, the work will be hard, and the challenge will be ever present. But it's certainly a week you'll never forget!

The Winners

Best Overall Wing	Italy
Best C-130 Aircrew	New Zealand
Best C-141 Aircrew	445 MAW
Best C-130 Maintenance	Germany
Best C-141 Maintenance	514 MAW
Best Shortfield Landing	Australia
Best C-130 ERO	463 TAW
Best C-141 ERO	438 MAW
Best Joint Inspection	463 TAW
Best Security Police	United Kingdom
Best Combat Control Team	Italy

The Gray Wings of an Eagle

by Maj. Grover C. Tate, Jr., USAF (Ret)
Joshua, Texas

Neil eased his tormented body into the chair at the breakfast table and let out a heavy sigh of physical relief. Although the day was already warm, he pulled his bathrobe tightly around him as if he was chilled. Victoria, his gracefully aging but still elegant wife, put a steaming cup of cinnamon-spiced coffee before him and he nursed it between both hands. He stared into space looking very much like a tired, disheveled, and aching old man.

"Honey, why don't you quit?" Victoria suggested. "Every time you come home from one of these long trips you look like a reject from Goodwill. You've done it all, sweetheart, and whether you care to see it or not, time is catching up."

He raised his faded grey eyes and appraised the pretty lady before him. He liked what he saw, but not what he heard. A trace of a smile danced at the corners of his mouth, but the grey eyes looked like old steel.

"I'm okay. Just a little weary from the last trip. It went longer than planned and we had a couple of minor incidents that worry me a little. A good breakfast, a hot shower, and I'll take you on for an afternoon of tennis," Neil answered. "And I'll beat you, too!"

Victoria shook her touseled auburn hair and turned her eyes heavenward as if seeking help from that direction. She placed Neil's breakfast before him and watched him in dismay as he used fresh orange juice to wash down a couple of pills he had taken from a pocket of his bathrobe.

"What are those?" asked Victoria.

"Oh, just a couple of vitamins pills the flight surgeon suggested I try for awhile," Neil lied.

"Good. Let me have a couple of them. Maybe they'll perk me up a bit for today's tennis match," Victoria said.

Special Category Winner, 1984 MAC Flying Safety Writing Contest

"Can't. That was the last of them. I'll drop by the hospital and pick up some more tomorrow," Neil continued to lie.

Victoria avoided Neil's eyes and puttered about the kitchen, her thoughts still centered on the rather forlorn figure slumped at the kitchen table. She knew that he would soon take a long hot shower, shave, and brush out his unruly hair to achieve the appearance of the elegant but aging military officer. She also knew that beneath that theatrical appearance, there was a damaged and failing body, a fact Neil would neither acknowledge nor admit. So many years, so many stations, so many miles traveled, so many lonely nights, so much worry, so many schools, so many airplanes, so many "brushfire wars," and now, suddenly, it's all reduced to two people grown older sooner than they had ever anticipated. She turned to her husband as he lit his third cigarette of the day.

"Neil, I've never nagged you about your flying because I've always known how important it was to you. I've tried not to complain when you were away so much and I spent the lonely nights reading everything that all America's book clubs could throw my way. Somehow, we managed to raise our kids, and that took a lot of my time and gave me comfort while you were gone. Now, the kids are all gone and it's just you and me. Most of the time, it's just me because you are away with your crew so much. We've paid our dues and we've been very fortunate in favors received in return. It's time for us to put our toys away and recognize that we're no longer a couple of Air Force kids enjoying the life that took us to exotic and faraway places. We are getting *old*, and like it or not, that involves a bit of falling apart physically and mentally," Victoria preached.

"Honey, I know what you're saying and I tend to agree. But you know I only want to stay until I make bird colonel. I promised you a long time ago I'd quit as soon as I got those eagles. Everyone needs a goal in life to aim for and that's mine. And it's so close now. I'm eligible, my last ER was good and I got a couple of spiffy commendations from those last emergency troop evacuation missions. It's so close, honey, let's just hang in there for a little while more," Neil was almost pleading and listening to his own speech as if to convince himself as well as Victoria.

"Sure, Neil. I understand all of that. What you don't understand is that you're pushing your luck to its limit and living a sort of make-believe life. We don't need a colonel's pay to live comfortably and heaven knows we don't need the status. You're a respected officer and you've done your job very well. Who, but you, cares whether you retire as an LC or a full colonel? All you care about is the elevated rank and the fancy hat. You don't need that, Neil. You have it made and now is the time to sit back and enjoy it," Victoria pleaded.

"No, you don't understand. I want to go out a winner. I know I can't make a star, but I can make bird, and that makes me a winner in my book. Sure, the years have stacked up on us, but I still pass my physicals, do a creditable job of flying the big birds, and haven't suffered any noticeable lapses into senility. Let's just ride it out for awhile longer and pretty soon we'll be flying away into the sunset on the wings of a eagle," Neil argued.

"I see...the cavalier who lost his plumed hat and sabre."

"Okay, Neil. I'll buy your argument, but you can get off of flying status and work at some other job until the promotion comes through. You don't have to meet the demanding flight schedules and you can still make your goal. How 'bout that?" Victoria countered.

Neil gave this idea a bit of thought and found it somewhat less than appealing. He felt that he and the other flyers were something special, special people with special talents. He thought of the thrill of an airplane accelerating on take-off, of flying into sunrise or sunset far out over a blue and sparkling ocean. He thought of the poet-flyer who reached out and "touched the face of God" and how he'd done the same. He thought of all of the joys he loved about flying and could not equate their loss to any advantage that he might gain as an officer on the ground. He rejected the idea of finishing his career on the ground; that would come

soon enough when he retired. He muttered a single, "No, no, I can't do that."

Tears spilled from Victoria's eyes. She didn't want to argue with her husband, but she felt that she was right and that there remained a mutual problem to be solved.

"Neil, whenever the phone rings for an alert you'll put on all of the adornments of your profession and race out of here like a newly-graduated pilot. You'll cover up any infirmities or pains with your 'vitamins' and then push yourself to hell and back to show that you're still a MAC tiger. You'll fool everyone around you except me. How you continue to con your way by the flight surgeon, I'll never know. But if he knew the things that I know about you, he'd not only ground you but he would have your driver's license taken away. Your crew and your buddies don't see what I see because they respect your privacy when you're on the road. They don't hear you scream out in the night with your recurring nightmares from a war long since past. They don't see you sweat the night away when the old malaria bugaboo grabs you for a few days. They don't see you use your right hand to support your left arm because of that arthritic mess in your shoulder. They don't see your knee buckle on the tennis court or when you step from a curb. They don't see the bottles of bootleg pain pills that you eat like popcorn. They don't find those same pills secreted in the pockets of your clothing. They don't know that you can't even hear the alarm on the wrist watch the kids gave you for Christmas. What they do see is a man who somehow or another bluffs his way through flight physicals and dashes 'bout like a teenager. I see the end result of that activity, the cavalier who lost his plumed hat and sabre. I see a man who has always given his best, a man who still pursues his goal regardless of growing inabilities. You, you don't see the risks that you impose upon others in your selfish pursuit of those damned silver chickens. You're going to keep on until you get another set of wings, and the sadness is that you'll take others with you, others who trust you and will be innocent victims of your selfish motives. You won't go out as a winner, but as the worst kind of loser!" she concluded and ran from the room.

Neil turned putty grey. Victoria's tirade had stung him to the core. Never before had she acted this way and never before was he forced to face facts and accept what she had said as truth. The temporary resentment he felt toward Victoria gradually gave way to logic. She didn't even know all of his secrets, but she knew enough of the things he thought he kept cleverly hidden. The family cat rubbed against Neil's leg in sympathy and when Neil reached to pet him, the pain in his shoulder screamed in protest. In that funny moment, the analysis by Victoria became painfully evident. At that instant, Neil made a decision.

Victoria slipped back into the kitchen just in time to hear Neil call in sick, then call the hospital for an appointment—an appointment that would surely lead to his being grounded. He looked up at Victoria, dug his hands in the pockets of the robe and fingered the "vitamins" hidden there—vitamins to ease the frequent headaches. He stool tall and smiled at the diminutive Victoria.

"Well, honey, I may be getting old and have a few pains, but I can still make a good command decision," he mumbled. "Now, how about some tennis?"

ABOUT THE AUTHOR

Maj. Grover Tate, USAF (Ret), has entered numerous MAC Flying Safety Writing Contests, winning several times. He is a happily retired 62-year old maverick who's last address before Joshua, Texas, was Zihuatanejo, Mexico. He works as a free lance writer when not actively pursuing his well-earned retirement. An ex-boxer, ex-pilot, ex-navigator, and ex-other fascinating careers, he's also an ex-"big corporation man" who confesses he's always marched to the beat of a different drummer!

C-130 MLG Brake Application After Hydraulic Pressure Loss

If you're a Hercules crewmember, or if you're involved with hydraulic system maintenance, you may be familiar with the paragraph in the C-130 Dash One on brake system accumulators. That section discusses the number of brake applications available in case of a hydraulic system pressure failure. The gist of the statement is that the normal brake system accumulator, when fully charged with hydraulic fluid, is capable of supplying pressure for about two brake applications. Some flight crews have put this system to the test and discovered, much to their chagrin, that the results don't always appear to agree with that statement. Instead of having sufficient pressure for two brake applications, the normal brake system accumulator may provide for only one. This has been a source of concern for some people; occasionally, crews have refused some aircraft when they discovered that only one brake application was available from the accumulator.

Actually, the braking system was probably working properly in these cases. The key point is the position of the anti-skid system switch. If the normal brake system accumulator's ability to provide hydraulic pressure for braking is tested with the anti-skid system switch in the ON position, one application is likely all that will be available.

Here's why. When the anti-skid system switch is in the ON position, power from the main DC bus is supplied for the parking-brake-off solenoids in the LH and RH anti-skid control valves. (Figure 1.) This in turn opens the solenoid-controlled shutoff valve (Fig. 2) in each anti-skid valve. Hydraulic fluid from each anti-skid valve will leak down

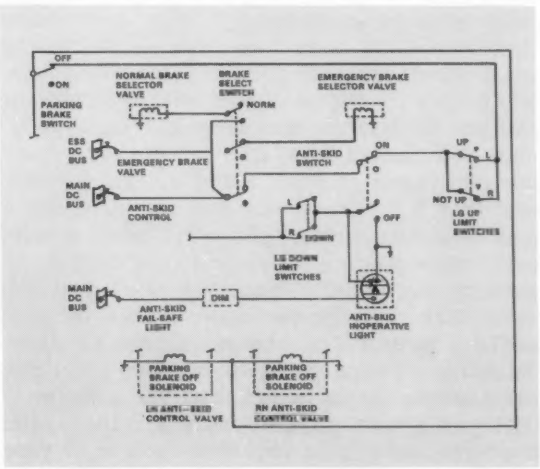


Figure 1. Anti-skid switch on—parking brake off solenoids energized

by John Walters
C-130 Group Engineer
Lockheed-Georgia
Marietta, Georgia

—Reprinted from Lockheed's C-130 *Service News*

at a rate of about 61 cubic inches per minute when the shutoff valve is open, for a total rate of 122 cubic inches per minute for both anti-skid valves.

When the first brake application is made, approximately 20 of the 50 cubic inches of hydraulic fluid stored in the normal brake system accumulator goes to fill brake cylinders. This leaves approximately 30 cubic inches of fluid in the accumulator. At a combined leak-down rate of 122 cubic inches per minute, the anti-skid valve can deplete the 30 cubic inches of fluid remaining in the accumulator in about 15 seconds. This accounts for the lack of pressure necessary for a second brake application; after only five seconds, there would be insufficient fluid available.

If the anti-skid system switch is in the OFF position, however, two brake applications will be available. The explanation for this is as follows. From Figure 3 we see that power from the main DC bus can't travel past the anti-skid system switch when the switch is OFF. Since no power is available to the solenoid-controlled shutoff valve in each anti-skid control valve, the shutoff valves remain closed. When the valves are closed, each anti-skid valve will only leak about 10 drops of hydraulic fluid per minute. This means that most of the 30 cubic inches of fluid still in the normal brake accumulator after one brake application is available for another application, and will remain so for some time.

Perhaps the old adage that "appearances can be deceiving" is appropriate here. You may think that you have a brake problem when you really don't. A quick scan of the anti-skid control panel and the switch position will give you a clue. Just remember that the anti-skid control switch should be in the OFF position for the brakes to "perform as advertised."

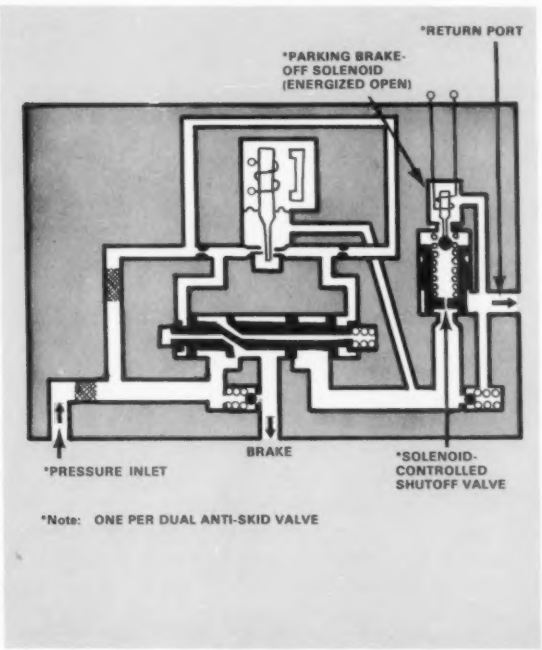


Figure 2. One half of dual anti-skid valve.

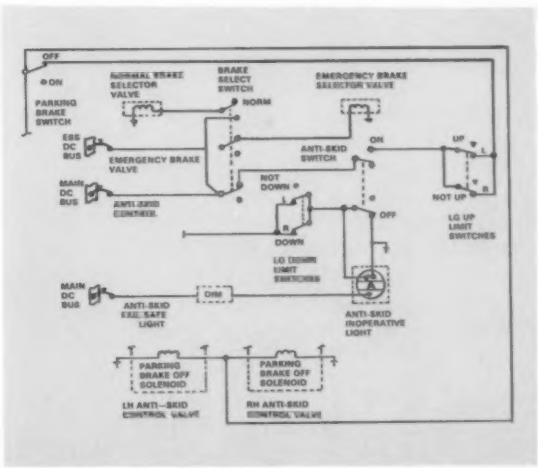


Figure 3. Anti-skid switch off—parking brake off solenoid deenergeized.

CRAF—Our Partners in Airlift

As we continue with the second installment in our salute to the airlines and aircraft which support the Civil Reserve Air Fleet (CRAF), the DC-10 stands out as another major contributor to our nation's airlift capability. Designed as a tri-jet, wide-body transport, the McDonnell Douglas DC-10 first entered service in August of 1971.

In 1974, the Air Force began a program to increase the nation's airlift capability by convincing airlines to add cargo convertibility features to wide-body passenger aircraft. These aircraft are modified either during initial production or as a retrofit, but can't be used in the cargo service configuration except in support of national defense needs.

In 1982, a United DC-10, modified during production, became the first aircraft to join the CRAF under this program. It's a convertible freighter version of the DC-10, and features a stronger main deck floor, along with a large cargo door. It's capable of carrying oversize cargo (defined as palletized cargo exceeding 104 inches in width, 84 inches in length, or 96 inches in height), a feat not possible on most other standard commercial aircraft.

SAC operates a modified version of the DC-10, designated the KC-10 Extender, in a dual tanker/cargo role. Capable of carrying 365,065 pounds of fuel in the tanker role, or 27 pallets in the cargo role, the Extender can

be effectively used in a mission combining both capabilities. The ability to refuel a number of fighters over long distance, while at the same time carrying the unit's support personnel and equipment, makes the KC-10 extremely valuable in the deployment of fighter squadrons.

The CRAF includes in its program over 76 DC-10s belonging to eight US air carriers (their logos appear above) who are voluntary participants in this vital program. Whether used as a passenger carrier, an all-cargo transporter, or as a military tanker/cargo aircraft, the McDonnell Douglas DC-10 is a proven performer and provides a valuable contribution to our nation's total airlift capability.

McDonnell-Douglas DC-10-30 Specifications

Length	181 feet 7 inches
Wing Span	165 feet 4 inches
Height	58 feet 1 inch
Max T/O Weight	572,000 pounds
Max Cargo Weight	175,800 pounds
Cruise Speed	600 mph plus
Range	3,000 statute miles

(175,800 pound payload)

Flying Hour Milestones

Lt Col Jacob L. Bland, 183 TAS
Lt Col William A. Jacob, II., 313 MAS
SMSgt George D. Coley, 97 MAS

Col Charles A. Vickery, 63 MAW/CC
Lt Col James R. Carlson, 1 MAS
Lt Col Dennis D. Wood, 53 WRS
Maj Robert B. Baldwin, 312 MAS
Maj Bruce M. Carskadon, 732 MAS
Maj Francis S. Eldredge, 1 MAS
Maj Robert F. Erling, 313 MAS
Maj John C. Harry, 1 MAS
Maj Richard F. Hay, 18 MAS
Maj John P. Jursnick, 732 MAS
Maj Lawrence N. Lacey, 20 AAS
Maj Paul W. Lavender, Jr., 312 MAS
Maj Charles P. Little, 313 MAS
Maj Thomas M. Odell, 97 MAS
Maj Gerald D. Sickafoose, 312 MAS
Maj Robert A. Stewart, 313 MAS
Maj Gary A. Wagoner, 732 MAS
Maj Kim S. Waterhouse, 313 MAS
Maj Lloyd C. Welken, 732 MAS
Capt James F. Gutmann, 97 MAS
Capt Melvin A. McDonald, 313 MAS
Capt Willard F. Sheldon, 17 TAS
Capt Donald W. Sloan, 732 MAS
CMSgt Jesse J. Clausen, 41 TAS
SMSgt Kenneth E. Emmerson, 1 MAS
MSgt John S. Orowski, 732 MAS
TSgt Charles R. Hoeppner, 1 MAS
TSgt David M. Spoons, 313 MAS
SSSgt Larry C. Battle, 20 AAS
SSgt Henry L. Brown, 1 MAS

Ranks and units are those at time of award. See MACR 900-3 for details on how to apply for your own milestone award.

The Wrong Stuff

Some time ago, Tom Wolfe wrote a book called *The Right Stuff*. In it, he traced the origins of that immeasurable, highly subjective quality that most pilots (especially fighter/test pilots) possess. He termed that quality the "right" stuff, and went on to define it as that singular quality that allows one who possesses it to virtually laugh in the face of impending disaster; even though it may mean the ultimate demise of the possessor. Wolfe tells of that breed of pilot who grew out of the searing hot sun and scorching sand of a place called Edwards. He tells of the "grandaddy" of all those who possess the right stuff, the now legendary Brig. Gen. Charles A. "Chuck" Yeager, USAF (ret). Such is the legend of the "right" stuff—the book, the author and those who possess the quality.

So great was the popularity of the genre that grew up around that legend that even non-test/fighter pilots began to think they might possess the "right" stuff. But, said the psychologists and others of the high mental capacity spectrum, what if they didn't, after all, possess the quality? What if they had the "wrong" stuff? What would happen to flight safety?

But let's talk about the "wrong" stuff. Does it exist?

Well, the answer is, in all probability, yes. Unfortunately, the wrong stuff does exist. You could define it as demonstrating the right stuff at the wrong time. Although most books, magazines, semi-literate articles and the like will more than likely attribute the right stuff to pilots and pilots alone, we in MAC won't. After all, we've long known that there are a lot of people who make airplanes go, and not all of them are pilots. And we in MAC also know that more people than just pilots possess the right stuff; to wit, navigators, flight engineers, loadmasters, etc. So back to our original definition. The wrong stuff is demonstrating the right stuff at the wrong time—and it's not just limited to pilots, either.

All crewmembers strive to discipline themselves to remain calm and functional under the stress of unusual or unexpected happenings. That's why we have simulator refreshers, training flights, and the like—to prepare for the unexpected. But sometimes, crewmembers intentionally *under*-react to demonstrate to others, and maybe to themselves, possession of the right stuff. Such a demonstration, however, could lead to disastrous results. Take a look at aborted takeoff mishaps, for example.

Invariably, the investigation that follows will state something like "maximum braking was applied too late to be effective." If you examine the cockpit voice recorder transcripts, you'll notice the crews, in almost all

cases, recognized the need to abort, but were slow in reducing the power and stepping on the "binders." In some cases, the mishap crews wasted valuable seconds as they exchanged comments on the situation before finally reacting. A case of the right stuff at the wrong time.

Granted, that's a broad generality, but there are other examples. If you don't believe it, take a look at the transcripts of other mishaps. Note how often the crew appears completely relaxed, even to the point of discussing their personal projects and aspirations while their flight brings them closer and closer to the edge of disaster. In some cases, the crew may have been totally unaware they had made some heinous mistake, but in many others, they were well aware of the situation, but were too busy displaying the right stuff. It makes admirable dialogue in the reports, but is little consolation to the departed crewmember's friends and families after the funeral.

Another category of too much right stuff displayed by pilots occurs in weather-related mishaps. For instance, how often have we seen or been part of a crew that felt obligated to shoot the approach and land just because the previous flight did so, despite comments made by the previous flight about icing, turbulence, below-minimums ceiling, low visibility, or the like? The "he made it, I'll make it, too" attitude is an especially dangerous manifestation of the wrong stuff—the right stuff that leads to ignoring published minimums and pressing on, regardless!

Still another category of how the wrong stuff can rear its ugly head is in the category of mishaps caused by aircraft malfunctions. In these examples, the crew pretty much ignores a minor problem other than to comment on its appearance, continuing to discuss whatever it was before the light came on, or the guage went off scale, etc. Showing they have the right stuff, the crew then makes the most off-handed remarks, in the most casual manner that, yeah, maybe we ought to do something about that problem. Transcripts usually reveal about four comments to such problems and go something like this:

A) "That's happened to me before, and such-and-such a thing worked;"

B) "It's a pain in the rear, but nothing to worry about;"

C) "This isn't in the checklist, but it works like a champ;" and

D) "Instructor, copilot. I'll just reach down and reset the circuit breaker..." or similar unsolicited attempts to rectify the situation. Remember, these comments and actions are performed in the most calm, casual, off-handed manner, befitting those imbued with the right stuff!

A recurring theme in many accidents involving professional crewmembers is the unfortunate tendency to put off immediate corrective actions when dealing with seemingly minor events. Again, unfortunately, and as most accident reports will substantiate, putting off corrective actions often has a "snowball" effect until the crew is totally overcome with problems. Decisive actions must be taken after due consideration, but they must be taken quickly in some instances or the situation can deteriorate, *rapidly*. Even the wrong action can, at times, be less harmful than total inaction while the pilot feigns disinterest.

Now, there's nothing inherently wrong in the sentiments expressed by any of the crewmembers in our scenarios. What is wrong, however, is the recurring theme that too many crewmembers (like the samurai warrior) put "losing face" ahead of their professional instincts. Too many times, an aircraft has been destroyed while the crew believed they were in total control.

Finally, we're not advocating that crewmembers become excited or frantic when faced with an unexpected problem. A modicum of calmness and coolness must prevail in any situation that calls for emergency actions, or chaos will inevitably result. The word here is moderation. Sure, we're taught to remain calm and cool, and that's the way it should be. But as professional crewmembers, we're taught to analyze the situation and take the proper action. We might also add, analyze *calmly* and then take the proper *timely* action.

The right stuff is a valuable part of a professional crewmember's character and will rightfully remain so. Possessing the right stuff separates us from those who pursue more mundane interests. But lest we all fall into that tender trap, let's take care that the right stuff doesn't become the wrong stuff, leading to mistaking coolness for complacency.

—Adapted from *Flight Safety Focus*

How Lightning Affects JET AIRCRAFT

by James K. Bogard
Airframe Systems Technology
Boeing Commercial Airplane Co.
Seattle, Washington

This article on lightning and jet aircraft provides a brief review of lightning and an update on today's jet aircraft and the continuing investigation of lightning. The last 20 years have brought new technologies into use in modern aircraft. Particularly, nonmetallic composite materials are being increasingly used for parts. Also, more and more digital electronic equipment is being used in avionics and control systems.

Does lightning pose the same threat to the new airplanes as it did to the old ones? What is the lightning threat going to be for future aircraft? We (the Boeing Co.) have some answers to these questions and continuing research will provide additional answers.

Introduction

Lightning is a phenomenon caused by the natural weather conditions surrounding the earth, and is most commonly produced from thunderstorms. Approximately *1,800* storms are in progress at any given moment, producing 44,000 thunderstorms, generating *9 million* lightning flashes each day!

Although thunderstorms are responsible for nearly all reported lightning, lightning has also occurred during snow storms. Violent sand and dust storms, and tornados reportedly have produced lightning. Lightning was even photographed in the ash cloud over volcano Surtsey, near Iceland, in December 1963.

Nature is not the only initiator of lightning, either. Five lightning flashes were photographed near the fireball of an experimental thermonuclear device exploded near Eniwetok atoll on 31 October 1952.

With so much T-storm activity around the world, the possibility of lightning striking aircraft is a valid concern. Because of this, most major airframe manufacturers design and build airplanes and avionics installations with lightning protection in mind. Each jet transport is evaluated to determine the best

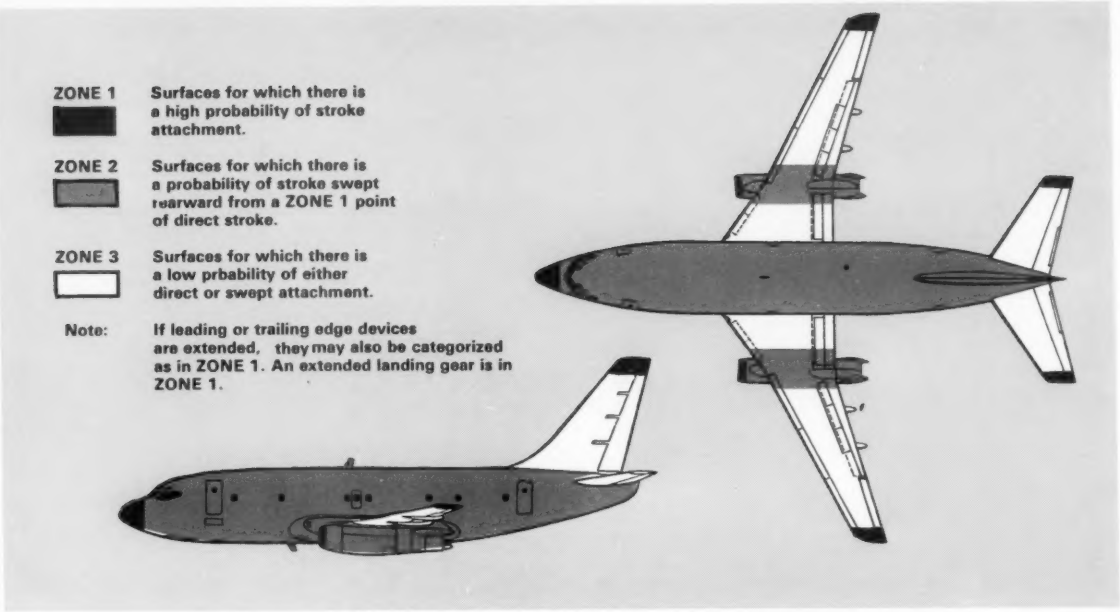

ZONE 1
Surfaces for which there is a high probability of stroke attachment.
ZONE 2
Surfaces for which there is a probability of stroke swept rearward from a ZONE 1 point of direct stroke.
ZONE 3
Surfaces for which there is a low prbability of either direct or swept attachment.
Note:
If leading or trailing edge devices are extended, they may also be categorized as in ZONE 1. An extended landing gear is in ZONE 1.

Figure 1. Boeing 737/T-43 aircraft lightning strike zone locations.

ways to protect the aircraft against lightning, and eliminate any possibility of significant damage. To make this evaluation, it's important to know where lightning will attach itself and travel through the aircraft.

Lightning Characteristics

In general, the outer surface of each aircraft is divided into three lightning zone categories. As an example, Figure 1 shows a Boeing 737/USAF T-43 lightning strike zone locations.

Generally, an aircraft is divided into zones to describe the expected lightning channel attachment magnitude and duration characteristics in each zone. The zones help the designer and lightning test engineer to determine the extent and type of protection required for any specific aircraft component. Zones are normally developed for individual aircraft by long arc tests on scale model aircraft, or by comparing them with the zones established for an aircraft similar in size and configuration.

Zone 1: Direct Stroke Attachment Zone. This zone is subject to initial attachment by a lightning strike. It's possible for lightning to attach to this area and remain attached for the entire duration of a stroke. Discharge times can approach, and in rare instances exceed one second. This zone includes the wingtips, projections such as nacelles, external fuel tanks, propeller disks, the fuselage nose, the tips of the horizontal stabilizer, and the tail cone. Because lightning has an affinity for protuberances, any other projecting part of the aircraft might constitute a point of direct strike attachment.

Zone 2: Swept-Stroke Attachment Zone. Swept-stroke surfaces are those for which

Figure 2. Long arc tests on 747 model shows attachment on left wing and streamering from number-one nacelle.

there is a possibility of strikes being swept rearward from a Zone 1 point of direct stroke attachment. This zone includes surfaces that extend 18 inches to each side of fore and aft lines passing through the Zone 1 forward projection points of the direct stroke attachment, and all fuselage and nacelle surfaces not defined as Zone 1 areas.

Zone 3. Zone 3 includes all the areas other than those covered by Zones 1 and 2 regions. In Zone 3, there is a low probability of any direct attachment of the lightning flash arc. Zone 3 areas may carry substantial amounts of electrical current, but only by conduction between some pair of direct or swept-stroke attachment and exit points.

Long Arcs and Swept Strokes

Figures 2 and 3 are taken from actual long arc attachment tests performed on a 747 scale aircraft. These and other long arc tests are performed to determine the probable lightning attachment points. In Figure 2, the attachment occurred at the left wing tip with streamering present from the outboard engine. This is representative of a strike in flight. Before being struck, streamers may extend from several points on the aircraft. The advancing lightning stepped leader will connect to one of the streamers which will complete the attachment to the aircraft. In Figure 3, the streamer branches out as it extends from the aircraft model while the stepped leader advances toward the model. This, too, is typical of the branching of stepped leaders and streamers in flight.

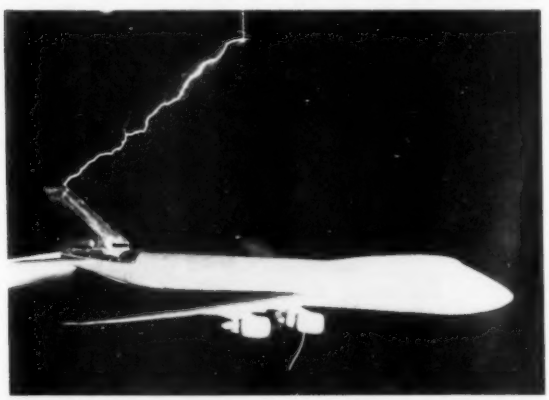


Figure 3. Long arc tests on 747 model shown at attachment to the vertical stabilizer.

The lightning *swept-stroke* phenomenon is the term given to the interaction between the lightning channel and the aircraft where the lightning current seems to sweep over the surface of the aircraft. Actually, the lightning channel remains relatively stationary once it has been established. The aircraft, while in flight, is moving forward and if the lightning channel were to make an attachment to the aircraft nose, the aircraft's forward velocity keeps it moving through the lightning channel. After the initial attachment, the lightning current would dwell at the attachment point as the aircraft continues to move. The more conductive the surface is, the shorter the dwell-time will be. Dwell-times can range from tens of microseconds up to the duration of the strike.

Aircraft Protection Requirements

The Federal Aviation Administration (FAA) is responsible for overseeing the government regulations concerning jet transports. Before the FAA will certify an aircraft for service, it must be satisfied the aircraft meets all applicable requirements. Lightning protection of the aircraft is one of the requirements that must be satisfied. The FAA and the aircraft industry have worked together to develop programs which produce aircraft that can survive the lightning strike threat.

The high level lightning current can cause melting and burning damage at the attachment point. Current flowing through the structure may cause arcing and sparking activity at joints in it. So, design criteria have been developed which call for minimum skin thicknesses to prevent burn-through and low resistance bonding schemes to prevent arcing and sparking or hot spots in high resistance joints and interfaces within fuel tanks. In metallic aircraft, structure and skin establish a Faraday cage which protects the crew, passengers, and equipment inside the aircraft.

Advances in the composite technology have brought an increased use of nonmetallic parts in today's aircraft, as well as offering yet another means to protect aircraft. The high strength and low weight of composites make them an attractive structural material

because a lighter weight airplane has greater fuel efficiency than heavier metal aircraft. Graphite epoxy is about 1,000 times less conductive than aluminum, and Kevlar^{R} epoxy and fiberglass are not conductive at all. Graphite epoxy structures can be built so they carry lightning currents. To minimize direct effects damage, conductive coverings or protection systems can be added to the structure.

Still another means of lightning protection of nonmetallic materials on aircraft is the radome which covers the radar. Lightning protection of the radome comes in the form of diverter strips which are applied to the exterior of the radome. These strips are applied in a pattern that produces the minimum amount of interference in the operation of the antenna, but will protect the antenna by conducting lightning current from the attachment point.

In addition to the direct effects, there may also be damage which results from the indirect effects of lightning. Indirect effects are electrical transient pulses produced by the electric and magnetic fields associated with the lightning current. Lightning current flowing through or near the aircraft tends to induce transient voltages and currents in the aircraft structure, wiring, hydraulic lines, and electrical or electronic equipment on board. Special shielding, insulators, isolators, and grounding techniques are used to protect against damage or upset from indirect effects.

Over the years, advances made in the electronics industry have been incorporated into the improvements in aircraft avionics systems. Concern over the indirect effects of lightning on these systems takes on greater importance if these systems are to be placed in use on composite airplanes. Avionics systems which are heavily populated with voltage and current sensitive semiconductors and integrated circuits could be susceptible to damage or upset from lightning-induced transients if these systems were to be left unprotected, so they must be protected by other schemes and devices.

If suitable shielding is not available from the aircraft structure, then the lightning protection must come through hardening of the electrical systems themselves. Wiring from LRU to LRU (line replaceable unit) can be protected by routing it near any metal in the structure. The wiring can also be shielded with wire braid or foil. Transient protection devices such as spark gaps, diodes, etc., can be placed inside LRUs.

In future generations, avionics sytems may use fiberoptics for transmitting signals. Fiberoptics, which conduct signals in the form of light, aren't susceptible to interference from lightning. However, the circuits converting electrical energy into light and light back to electrical energy would need protection.

On-Going Efforts

Interest in lightning activity is high and researchers continue to search for an understanding of the interaction between lightning and aircraft. NASA, the National Aeronautics and Space Administration, has been using an F-106B to deliberately penetrate thunderstorms to gain valuable lightning-strike data. Onboard equipment is used to measure and record pertinent electrical activity resulting from a lightning strike to the aircraft. From 1980 through 1982, the NASA researchers and the F-106 made *419* thunderstorm penetrations. Here's what they learned:

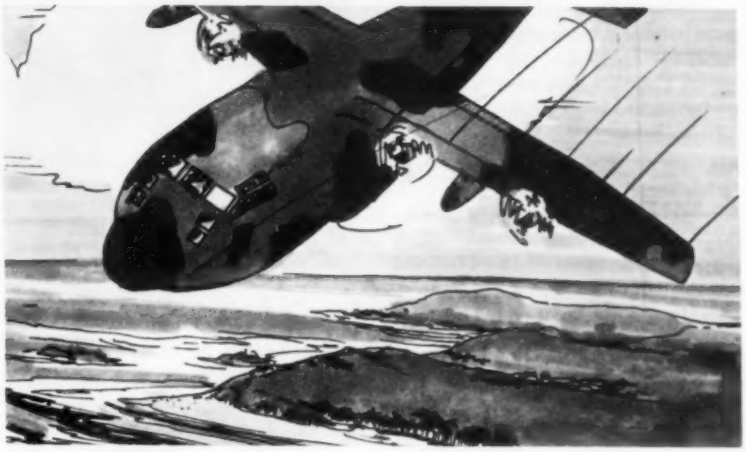
1. Mean strike altitude was 8.7 km, or about 28,400 feet.
2. Mean strike temperature was -32°C.
3. Peak strike rate occurred at ambient temperatures of between -40°C and -45°C, whereas most previously reported strikes have occurred at or near the freezing level (0°C).
4. Lightning strikes have been encountered at nearly all temperatures and altitudes, usually where the relative turbulence and precipitation intensities are characterized as being negligible. Therefore, the presence and location of lightning don't necessarily indicate the presence and location of hazardous precipitation and turbulence.

Through projects such as these, the aircraft industry will continue to gain in understanding lightning and its effects on modern aircraft. This will help keep the protection level high for flying in or near a lightning environment when it can't be avoided.

—Reprinted from the Boeing *Airliner*

C.R. TERROR

The Sultan of Sun slacks off and gets a sunburn, too!



Watch out for MiGs there, Sammy m'lad," directed the Ace of Airlift, "and let's make sure 'Old Whiskers' doesn't try to give us an escort into 'Gitmo.'" C.R. Terror then banked the camouflaged Hercules steeply to give his stalwart second-in-command a better view, ending up at nearly 60° of bank.

"Hey, pilot," a slightly worried voice came from the rear, "watch your bank. Some of these Marines back here are beginning to turn greener than their fatigues."

"Yeah, Boss," reiterated Long Suffering Sam, "remember MAC's 30° limit."

"Alright, already," the Miffed Major retorted, "I get the message. Criminently!"

"By the way," piped up Blinky, "just what is the purpose of our little sojourn to this side of Guantanamo? I thought they only had one airfield there."

"They used to," replied C.R. "Why, I can remember bringing C-130s into McCalla Field back when there was only one runway. In those days, you didn't have to detour half way around the world to get there, either. Of course, overflying Havana was legal, too. Ah, yes. Those were the good old days."

"But what about today, Boss?" requested Sam.

"Oh, that. Ahem, well, you see, it's like this. Ahem..." C.R. suddenly seemed at a loss for words.

"Oh, here it is in the frag, Boss," chimed in Max coming speedily to the rescue. "Looks like the semi-annual test for the Marines and the C-130s."

"Just as I was about to say, Max," sighed C.R. "This is a semi-annual test for us and them. Before-landing checklist, copilot. Flaps 50 percent and gear down. All on-speed, of course." The Magic Major's fingers pulled the throttles back smoothly, if somewhat suddenly, and the big turboprop immediately began to slow from its enroute speed.

"Flaps are 50 percent, and the gear's down." Sammy dutifully read the items, completing the before landing checklist in record time.

"There it is, crew. I've got the field in sight," blared the Boisterous Buffoon over interphone. "Gimme 100 percent flaps and let's do a semi-maximum effort onto the tarmac. Whoa, hoss!" he barked as he pirouetted the Lockheed legend around 90 degrees for a try at the runway. Surprisingly, C.R. managed a commendable landing, even for him, and the crew began the ERO of the Marines. Suddenly, a red light flashed in the number-four engine T-handle.

"Did anybody see that?" asked Sam, not quite believing his eyes.

"See what, copilot?"

inquired C.R. But before anyone else could utter a sound, the light came back on and stayed on.

"That, Boss!" exclaimed Sam. "Crew, we have a fire light on the number-four engine."

"Shut down number four, copilot," commanded C.R., "and I'll call the fire trucks."

A short while later, the crew stood around the desk of the billeting office speculating on their collective fate.

"Well, so much for our 24 hours off at Homestead, Boss," remarked Max offhandedly. "By the way, what's the per diem down here?"

"Not much, Max," replied Ty. "Everything is at Uncle Sam's expense, even the surf."

About that time, Sam, having called 21st Air Force, walked up to the crew and informed them of the news. "Well, I've got good news and bad news, folks," remarked the jovial second-seater. "Which do you want first?"

"The good news, Sam," sighed Blinky. "We've had our share of bad news today."

"Indubitably, Sam. What is the news, good and bad?" directed the Rhinestone Flyboy.

"Well, the good news is that Pope has an engine all crated up and ready to ship to us..."

"Yahoo, Sam. That's great news," yelped C.R. "How could any news be bad after that? We'll be at the jai alai games by late tonight after all!"

Sam winced as he started with the bad tidings. "But it seems that with Volant Rodeo at Pope right now, and with the lack of channel traffic, it'll be about three days before they can get the engine here."

"You're kidding, Sam. Please say you're pulling our collective legs and that we'll be out of here by tomorrow. *Please* say that, Sam," begged the crewmembers in unison.

"Sorry, folks. Twenty-First said just to sit tight and they'd do the best they could."

"Well, I don't know about the rest of you, but yours truly is going to relax and enjoy the sunny tropical tradewinds," remarked C.R. "Besides, this place is noted for its unique gourmet libations."

The next day dawned bright and clear, a balmy breeze blowing off the sparkling Caribbean. C.R., up some three hours before his usual 1100 wake-up time, was already at the pool. When Sam and Blinky finally arrived at the pool, the Ace of Airlift already had a "Jungle Juice" highboy beside him, and was literally swimming in suntan oil.

"Well, well. About time you sleepy heads rolled around here. I've already been up for four hours, run six miles, and...."

"Uh, yeah, Boss. Sorry we're late. We'll try to make up for lost time. What kind of sun tanning lotion have you got on? Smells like cod liver oil."

"A derivative, Sam. A derivative. Only the best for my baby-soft epidermis, you know. It's Smythe & Smythe cod liver oil and super tanning solution. Got a protection factor of about 0.2."

"But your skin is so white, Boss. Shouldn't you be using an almost-total sunscreen?" asked Sam.

"Nonsense, Sammy. Why, I'm never more at home than under the sun. Besides," continued the Solar Sultan, "if I do happen to burn a little, I've got an extra day to recuperate. Now, I think I'll take a little nap." C.R. finished off the rest of the tropical punch-based brew, immediately dozed off, and was soon doing an imitation

of a chain saw.

The next day, Sam was awakened with a phone call from 21st Air Force operations center.

"That engine and the maintenance personnel should be there in about an hour," the controller drawled. "Do you think ya'll could be ready to go once it's 'hung and run'?"

"I'll check with the AC," replied Sam, "but it should be no problem."

"Good," replied the controller. "We'll be looking for a call from you guys when you're airborne."

Sammy put the phone back on the cradle and went next door to inform C.R. He knocked on the door thinking the Menial Major would already be up. Instead, he was greeted with an ear-piercing scream!

"Boss? Are you okay? Is there anything wrong?"

"Yeeoowwwwch! Get me a fire extinguisher! Quick, order some ice! Water!"

Sammy burst into the room to find an eerie red glow cast over the room. C.R. was standing with his arms strangely outstretched and curved, his general outline reminding Sam of an overinflated balloon. "What's wrong with you, Boss?" Sam went up and was about to touch his AC, but C.R. jumped back.

"Oowww! Don't touch me, Sam," he winced. "I'm sunburned all over. I'm going back to bed. If I can get back in it. Ouch!"

"But Boss. Twenty-First wants us out of here as soon as that engine is on. Seems they have a high priority add-on mission they want us to pick up," stated Sam matter-of-factly.

"What am I going to do, Sam?" asked the Crimson-colored C.R. "Do you realize that if I do stay here it could mean Article 15-city—an unjust and undeserved blemish on my otherwise sterling service record? Sam, I need your help." C.R. was desperate.

Several hours later, the new engine had been run, the old engine tied down, and Sammy and Blinky had filed a flight plan back to McMac. C.R. followed his two stalwart young eagles around the NAS Leeward base operations gingerly, limping because the soles of his feet were also sunburned.

"Remember, Sam. Once we get airborne, you got it. And thanks for helping me out," remarked the Over-Tanned Titan of the Airways.

"I don't know, Boss," replied Sam hesitantly, "I think you'd better report to the Navy flight surgeon and get something for your sunburn. You know there may be more wrong than just charred skin."

"Not on my career, Sam. Now let me sign that flight plan and let's get into the air. Time's awastin'."

C.R. eased himself gingerly into the left seat and made ready to get under way. Luckily, the palms of his hands weren't sunburned, and he was able to grasp the throttles, nosewheel steering and the like easily. But everything else, including his bulbous nose, was a brilliant beet red.

Shortly after they had leveled off, however, C.R. began to feel woozy.

"Sam, you've got it," the Suntanned Sultan said meekly. "I don't feel so good." He then slumped back and passed completely out.

Sammy, used to the unexpected after years of flying with MAC's Most Senior Major, had a plan in mind.

"Miami Center, Tubo 52, emergency."

"Tubo 52, Miami. Go ahead."

"Roger, sir. Tubo 52 has a, er, physiological incident aboard. Request diversion to Homestead, present position direct. And also request an ambulance and a flight surgeon stand by to meet the aircraft."

"Tubo 52 is cleared present position direct Homestead, and I'll pass on your information to Homestead ops."

After Sam, Ty, Max, and Blinky had done their usual sterling job of making the best of a bad situation and landed, the Helpless Honcho was taken to the emergency room. Later, when he had regained consciousness, Sam and Blinky went up to his ward.

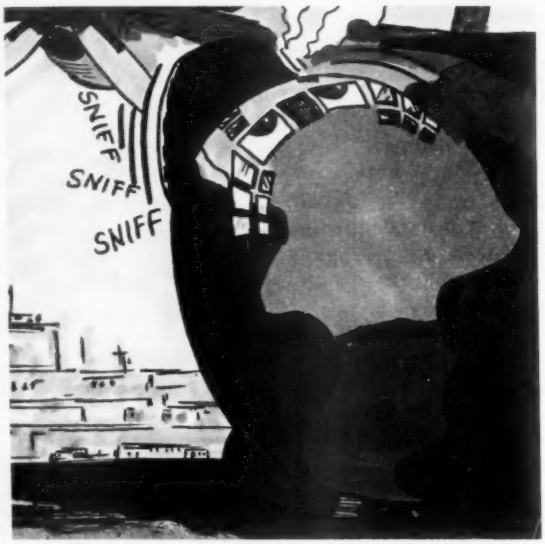
"Gee, Boss, you're looking better already," said Sam.

"Yeah, sir. We didn't think you were in *that* bad a shape."

C.R. looked up and moaned. "But it'll be a while before I can get back on flying status, m'lads. The flight surgeon said I'll have to go to Brooks and get a complete physical exam which takes about a week. By the way," he continued, "what are you guys going to do until they can send down another AC for the crew?"

"Why, what else?" said Blinky, nodding at Sam. "We're going out to Miami Beach and get a tan!"

Quick Stoppers



"Fumes? What fum...!"

The H-model Herk had just completed a single-ship air drop and executed the escape maneuver when the loadmaster notified the crew there were fuel fumes in the cargo compartment. The navigator verified the odors, so the engineer selected aux/vent on the air conditioning system and went aft to check for a leak. The loadmaster then informed the pilot he was nauseous from the fuel smell, put his oxygen on and selected 100 percent. The engineer donned a smoke mask and soon determined fuel was venting from the right auxiliary tank vent. The venting decreased in level flight, so the AC discontinued the mission and returned to base for a normal landing. How did the fuel vapors get into the Herk? It seems the right aux tank had a faulty flapper valve which allowed fuel to vent. The fuel then streamed back onto the flap and then inboard towards the wing root. The fumes were drawn into the aircraft while the doors and ramp were open during the airdrop. Maintenance replaced a faulty spring on the flapper valve and corrected the problem.

Unsealed Sabreliner

The CT-39 was level at FL 350 enroute to sunny Florida with the crew and passengers enjoying an unrestricted view and smooth air. That came to an abrupt halt, though, when the door-open light illuminated, followed immediately by the loss of cabin pressurization. The AC got everybody on oxygen, declared an emergency and began an emergency descent, noting the cabin altitude at 33,000. Passing through FL 270, the cabin pressurization returned and soon dropped to 8,000. The crew continued their descent, however, and diverted to a nearby military base. After an uneventful landing, the crew and passengers were examined and released by a flight surgeon. Maintenance determined the cause of the incident was the crew entrance door safety switch, which moved out of adjustment and released air pressure to the door seals.

Hard-Hitting Huey

The HH-1 was on remote training flight in mountainous terrain, and had completed work at two of the training sites, both located above 7,000 feet MSL. The first ended in a normal landing and the second in a planned 20 foot hover. Enroute to the third site, the IP directed the CP to brief and plan on flying a simulated maximum power approach and takeoff. After completing both a high and a low recon of the site, the CP initiated the approach. At about 100 feet AGL, though, they heard the low RPM warning horn and noticed the engine decelerating. The IP immediately took control of the aircraft, ensured the throttle was full open and guided the helicopter to the landing site. He used a slight flare to ensure the helicopter didn't go beyond the level landing area. That accomplished, he rolled the throttle to flight idle and used the remaining collective to cushion the landing. The helicopter landed hard, spreading the skids, then bounced once before coming to a halt. During the landing, a main rotor blade struck the tail boom, severing the tail rotor drive shaft. The crew then shut down all systems, applied rotor brake and departed their damaged helicopter without injury. Quick thinking, skillful flying and a dose of good fortune clearly prevented serious damage to the helicopter and injury or death to the three persons on board.

Go Fly a Kite!

As a part of an air show, a Starlifter was scheduled to make a low approach over the airfield; all prior coordination, planning and approval complete, of course. As the C-141 began its low approach, however, the crew spotted a kite directly in front of them. The AC attempted an evasive banking maneuver, but struck the kite with the aircraft's left wing. An inflight scan revealed no damage, so the Starlifter recovered to home station where a post flight inspection discovered a broken landing light. Just when we think we have all the safety angles covered, somebody comes up with a new hazard. Therefore, we at *TMF* feel obligated to ask aircrews to be alert for unreported kites in addition to flocks of birds, ultralights, balloons, gliders, etc.

Quick Stoppers

No Sweat! Really?

On takeoff roll for a heavyweight air refueling training mission, the C-5 AC saw several birds running across the runway ahead of the aircraft. As the Galaxy lifted off, the crew heard a loud banging noise, but didn't believe any birds had flown up or struck the aircraft. The noise changed to a rumble during climb out and the crew suspected a blown visor seal. But a scan showed the seal was intact. The engineer then ran a thorough vibration check on all four engines, with everything checking out normal. Turning to the possibility of a dropped panel, the crew inspected all visible aircraft surfaces, again noting nothing wrong. Since the rumble decreased at altitude, the crew continued the mission and flew for five hours with no abnormal indications noted. During post flight inspection, though, maintenance discovered four damaged second-stage fan blades on the number-four engine, with bird remains in the engine inlet and fan exhaust. One of the blades had a four-inch crack and nother had a nine-inch crack. Sometimes our aircraft try to tell us something's wrong.

After Deadlines

NEW FACES AT MAC SAFETY—Summer usually means PCS, and there are several new faces in the Directorate of Safety. Col. Richard W. Blatter is MAC's new deputy director of safety. Colonel Blatter comes to HQ MAC from Yongsan, Korea, where he was the MAC liaison officer to the United Nations Command. Maj. John Bonner, flight safety chief, leaves for a tour in VC-140s at the 89 MAW. Replacing Major Bonner is Maj. Bill Richard who steps downstairs after a tour on the IG travelling team as a safety inspector. Capt. Dick Casey leaves the post of C-130 weapons system safety officer for academic endeavors at Air Command and Staff College. Replacing Dick is Maj. Bill Rouse who comes to MAC from the safety office at Pope AFB, N.C. Coming to flight safety under the Volant Spotlight program is Capt. Mark Stearns. Mark hails from the 37 ARRS stan-eval shop at F.E. Warren AFB, WY. Mr. George West moves into the ground safety division from 22d Air Force to take over motor vehicle operations. Handling the engineering and services branch of ground safety is Mr. Rolen Johns who comes to MAC from Lajes Field. Last but not least, Mr. Karl Perry takes over the industrial branch in the ground safety division. Mr. Perry comes to MAC from Little Rock AFB, AR., where he was the ground safety officer.

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55 ARRS NAMED BEST IN RESCUE—The 55 ARRS, Eglin AFB, FL., was recently named the recipient of the Commander-in-Chief's Trophy as the outstanding rescue/weather reconnaissance squadron in MAC. The 55th was responsible for the initial deployment of the UH-60A Blackhawk, and also for developing the HC-130 rescue/SOLL program. In addition, the unit played key roles in Red Flag, Solid Shield, Casino Dancer, Night Venture, and Casa Natcho. During the year, the squadron was credited with 12 saves, while completing 19 years and 60,000 flying hours without a mishap. Congratulations from *TMF*.

CHARLESTON C-141 CREW AIDS SEAMAN—Capt. Jim Fellows and his 41 MAS SOLL II crew were instrumental in helping a civilian seaman whose catamaran overturned while sailing from Pago Pago to Hawaii. Capt. Fellows and his crew, chosen for their low-level expertise, found the distressed sailor after an extensive search. The man then climbed into one of the rafts dropped by the crew, andwas rescued the next morning by a merchant marine freighter. Along with Captain Fellows, *TMF* "well-dones" go to crewmembers Maj. James Bennett, Capt. Harry Harley, 1st Lt. Al Merritt, MSgt. George Pearce, TSgt. Bruce McDonald, SSgt. Richard D. Rogers, and Sgt. Philip W. Horne, III.

AFISC PREDICTS C-12F MISHAP—The Air Force Inspection and Safety Center at Norton AFB has predicted one class-A, operator-caused mishap within the first 12 months of operation for the C-12F. AFISC made this prediction based on past USAF mishap experience with other C-12s in service, and civilian mishap history of similar aircraft. This is one goal C-12F-types should strive not to meet!

HAPPY BIRTHDAY HERK!—August 23 marks the 30th anniversary maiden flight of the prototype YC-130A. On that date in 1954, the first Herk left the runway at Lockheed's Burbank, California plant after a mere 800-foot ground roll. Since that auspicious first flight, more than 1,700 C-130s have rolled down the Lockheed-Georgia assembly line, finding homes in 55 countries. *TMF* will highlight that historic first flight and the history of the Hercules in next month's issue. We'll also discover what happens when jet aircraft fly through a volcanic ash cloud, and what real pilots don't eat.

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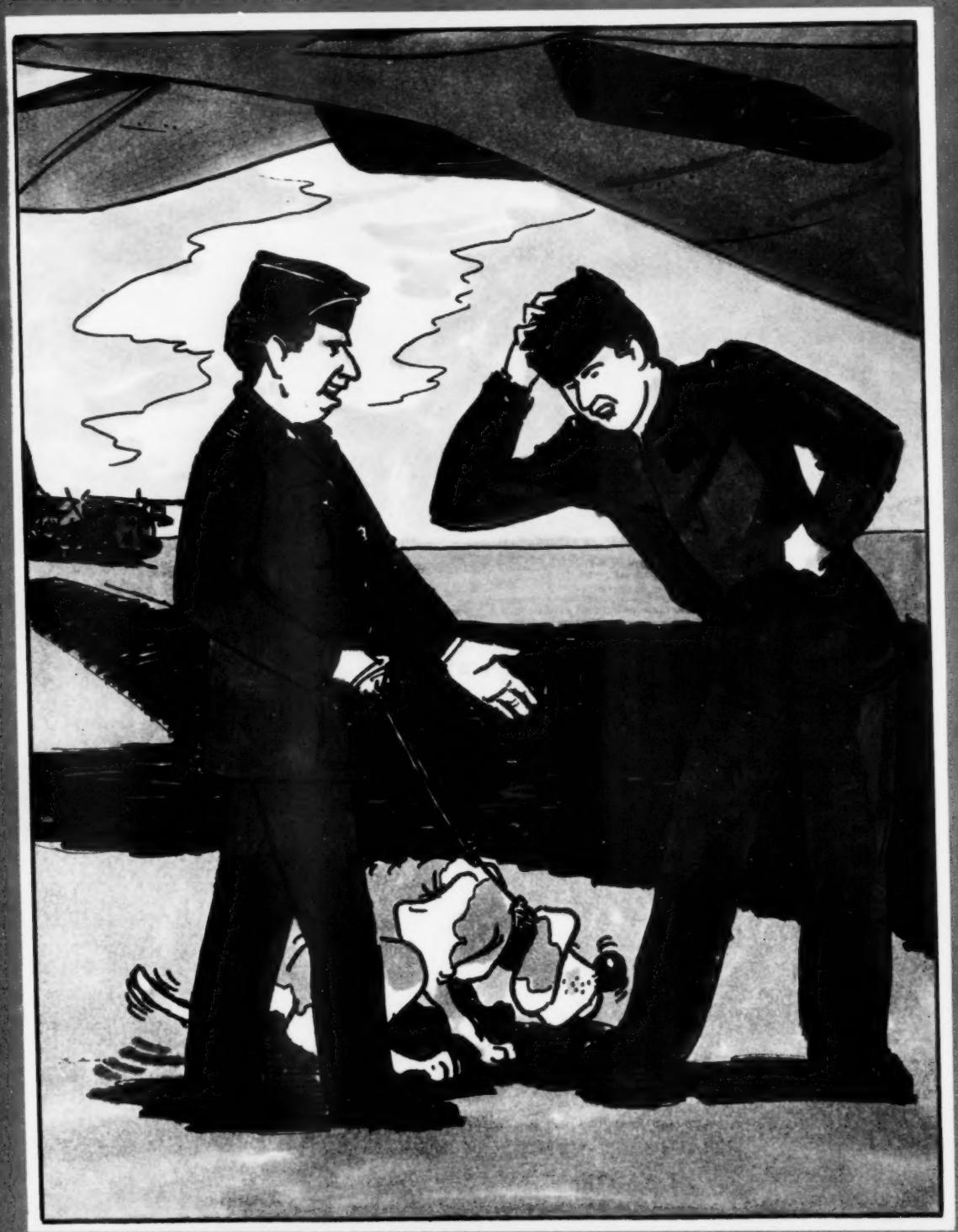

"I've trained him, Lieutenant, to find your drops on the drop zone!"

Thanks for the idea and a tip of the hat to Hercu-Line, *927 TAG (AFRES), Selfridge ANG Base, Michigan.*